Remarks

Claims 1-43 are canceled. Claims 44-53 are pending. Claims 48-53 are withdrawn as being directed to non-elected inventions. Claims 44-47 are under consideration. Claims 44 and 46 are amended herein to more clearly define what applicants consider to be their invention. Support for these amendments can be found in the original claim language and throughout the specification, as set forth below. It is believed that these amendments add no new matter. A Terminal Disclaimer in compliance with 37 C.F.R. § 1.321(c) is submitted herewith. In light of these amendments and the following remarks, applicants respectfully request reconsideration of this application, entry of these amendments and Terminal Disclaimer, and allowance of the claims to issue.

35 U.S.C. § 112, second paragraph

Claims 44-47 are rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Specifically, the Office Action states that based on the recitation "at least about nine amino acid residues in length to **about** 35 amino acid residues in length," it is unclear what the length of the peptide is.

Claims 44 and 46 are amended herein by deleting the term "about" preceding the terms "nine" and "35." Support can be found in the specification on page 8, lines 13-15. Applicants believe these rejections are overcome and respectfully request their withdrawal and allowance of amended claims 44 and 46 and dependent claims 45 and 47.

35 U.S.C. § 112, first paragraph

Claims 44-47 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. Specifically, the Office Action states that when a claim covers a genus of inventions, the specification must provide written description support for the entire scope of the genus. The Office Action goes on to state that support for a genus is generally found where the applicant has provided a number of examples sufficient so that one in the art would recognize from the specification the scope of what is being claimed or through disclosure of a functional characteristic of the claimed genus coupled with a known or disclosed non-functional characteristic (structure) that correlates to the function. The Office Action states that applicants fail to demonstrate the distinguishing characteristics necessary for the peptide to bind to HAV antibodies; for example, the specification fails to disclose structural epitopes of antibodies against Hepatitis A virus in which the peptides would bind.

The written description requirement for a claimed genus may be satisfied through sufficient description of a representative number of species by actual reduction to practice..., reduction to drawings..., or by disclosure of relevant, identifying characteristics, i.e., structure or other physical and/or chemical properties, by functional characteristics coupled with a known or disclosed correlation between function and structure, or by a combination of such identifying characteristics, sufficient to show the applicant was in possession of the claimed genus ...." See *Eli Lilly*, 119 F.3d at 1568.

"A representative number of species" means that the species which are adequately described are representative of the entire genus." "What constitutes a 'representative number' is an inverse function of the skill and knowledge in the art. Satisfactory disclosure of a

'representative number' depends on whether one of skill in the art would recognize that the applicant was in possession of the necessary common attributes or features of the elements possessed by the members of the genus in view of the species disclosed." M.P.E.P. § 2163.

Applicants initially discovered that synthetic peptides having one or more glutamine residues at the C-terminus of the peptide are reactive with HAV antibodies. These peptides contained antigenic epitopes, modified antigenic epitopes, or combinations of antigenic epitopes of the major structural capsid polypeptides or non-structural polypeptides of HAV. The synthetic peptides have a length of nine to thirty-five amino acids. Preferred synthetic peptides contained one glutamine residue at the C-terminus of the peptide. See in the specification page 8, first paragraph.

Subsequent to the discovery above, applicants made an even more surprising discovery that synthetic peptides containing nine to thirty-five amino acid residues and having a glutamine residue (Q) at the C-terminus of the amino acid sequence will bind to an antibody directed against Hepatitis A virus (HAV), even though the peptide does not comprise antigenic epitopes, modified antigenic epitopes, or combinations of antigenic epitopes of the major structural capsid polypeptides or non-structural polypeptides of HAV. That is, applicants found that not only do synthetic peptides containing nine to thirty-five amino acid residues containing immunogenic epitopes of HAV and having a Q residue at the C-terminus of the peptide bind to antibodies directed against HAV, but also synthetic peptides containing nine to thirty-five amino acid residues and having a Q residue at the C-terminus of the peptide will bind to an antibody directed against HAV, for example an IgM antibody, even though the artificially designed primary

structure of the synthetic peptides are not identical to HAV. See in the specification page 47, lines 22-25.

The Office Action is misdirected when it alleges that "applicants fail to demonstrate the distinguishing characteristics necessary for the peptide to bind to HAV antibodies; for example, the specification fails to disclose structural epitopes of antibodies against Hepatitis A virus in which the peptides would bind." See Office Action, page 4, second paragraph. Applicants' surprising discovery is that synthetic peptides containing nine to thirty-five amino acid residues and having a glutamine residue (Q) at the C-terminus of the amino acid sequence will bind to an antibody directed against Hepatitis A virus (HAV), even if the peptide does not comprise an antigenic epitope, modified antigenic epitope, or combination of antigenic epitopes of HAV. Therefore, it is not necessary that applicants teach an epitope of an antibody directed against HAV to which the claimed peptides can bind because the claimed genus of peptides binds to antibodies directed against HAV, irrespective of which epitopes may be presented by the antibody.

Applicants provide, as shown below, numerous examples of species that are representative of the claimed genus so that one of skill in the art would recognize from the specification the scope of what is being claimed. Further, applicants disclose a functional characteristic of the claimed genus, coupled with a disclosed non-functional characteristic (structure) that correlates to the function. Functionally, each species binds to an antibody directed against HAV. The structural characteristic that correlates to the function is the presence of a glutamine residue at the C-terminus of each synthetic peptide which can be from nine to thirty-five amino acid residues in length.

Applicants initially discovered eighty-eight (88) representative synthetic peptides, containing from nine to thirty-five amino acid residues including one glutamine residue at the C-terminus of the peptide. For example, a synthetic peptide can include an amino acid sequence that contains a Q amino acid residue at the C-terminal and both an antigenic portion of the amino acid sequence of the VP4 protein of the HAV polyprotein and an antigenic portion of the amino acid sequence of the VP2 protein of the HAV polyprotein. This synthetic peptide includes one or more of the amino acid sequences of SEQ ID NOS:1-10 and conservative variations thereof. See in the specification page 12, lines 10 to 29. A synthetic peptide can also include an amino acid sequence that is substantially similar to an antigenic portion of the VP3 protein of the HAV polyprotein and contains a Q amino acid residue at the C-terminal of the peptide. This synthetic peptide includes one or more of the amino acid sequences of SEQ ID NOS:11-22 and conservative variations thereof. See in the specification page 12, line 30 to page 12, line 20.

A synthetic peptide can also include an amino acid sequence that is substantially similar to an antigenic portion of the VP1 protein of the HAV polyprotein and contains a Q amino acid residue at the C-terminal of the peptide. This synthetic peptide includes one or more of the amino acid sequences of SEQ ID NOS:23-38 and conservative variations thereof. See in the specification page 13, line 21 to page 14, line 15. Moreover, a synthetic peptide can include an amino acid sequence that is substantially similar to an antigenic portion of the P2A protein of the HAV polyprotein and contains a Q amino acid residue at the C-terminal of the peptide. This synthetic peptide includes one or more of the amino acid sequences of SEQ ID NOS:39-48 and conservative variations thereof. See in the specification page 14, lines 16 to 34. A synthetic peptide can include an amino acid sequence that is substantially similar to an antigenic portion of

the P2B protein of the HAV polyprotein and contains a Q amino acid residue at the C-terminal of the peptide. This synthetic peptide includes the amino acid sequence of SEQ ID NO:49 and conservative variations thereof. See in the specification page 15, lines 5 to 13.

Moreover, a synthetic peptide can include an amino acid sequence that is substantially similar to an antigenic portion of the P2C protein of the HAV polyprotein and contains a Q amino acid residue at the C-terminal of the peptide. This synthetic peptide includes one or more of the amino acid sequences of SEQ ID NOS:50-61 and conservative variations thereof. See in the specification page 15, lines 14 to 34. A synthetic peptide can include an amino acid sequence that is substantially similar to an antigenic portion of the P3A protein of the HAV polyprotein and contains a Q amino acid residue at the C-terminal of the peptide. This synthetic peptide includes one or more of the amino acid sequences of SEQ ID NOS:62-65 and conservative variations thereof. See in the specification page 16, lines 5 to 17. Also, a synthetic peptide can include an amino acid sequence substantially similar to an antigenic portion of the P3B protein of the HAV polyprotein and contains a Q amino acid residue at the C-terminal of the peptide. This synthetic peptide includes the amino acid sequence of SEQ ID NO:66 and conservative variations thereof. See in the specification page 16, lines 18 to 26.

A synthetic peptide can include an amino acid sequence which is substantially similar to an antigenic portion of the P3C protein of the HAV polyprotein and contains a Q amino acid residue at the C-terminal of the peptide. This synthetic peptide includes one or more of the amino acid sequences of SEQ ID NOS:67-72 and conservative variations thereof. See in the specification page 16, line 27 to page 17, line 12. Also, a synthetic peptide can include an amino acid sequence which is substantially similar to an antigenic portion of the P3D protein of the

HAV polyprotein and contains a Q amino acid residue at the C-terminal of the peptide. This synthetic peptide includes one or more of the amino acid sequences of SEQ ID NOS:73-88 and conservative variations thereof. See in the specification page 17, line 13 to page 18, line 7.

It is clear that each of the eighty-eight disclosed species (synthetic peptides) is from nine to thirty-five amino acid residues in length, and each has a glutamine at its C-terminus. Each species binds to an antibody directed against HAV and, thus, possesses the necessary common attributes or features of the elements possessed by the members of the genus.

Moreover, applicants synthesized six peptides having an artificially designed primary structure that was not identical to HAV and which did not contain an epitope of HAV. These six peptides are identified as SEQ ID NO:89, SEQ ID NO:90, SEQ ID NO:91, SEQ ID NO:92, SEQ ID NO:93, and SEQ ID NO:94. SEQ ID NO:90 is identical to SEQ ID NO:89, except that SEQ ID NO:90 has an additional glutamine residue at the C-terminus. SEQ ID NO:92 is identical to SEQ ID NO:91, except that SEQ ID NO:92 has an additional glutamine at the C-terminus. SEQ ID NO:94 is identical to SEQ ID NO:93, except that SEQ ID NO:94 has an additional glutamine residue at the C-terminus.

None of the three synthetic peptides that have no glutamine residue at the C-terminus (SEQ ID NO:89, SEQ ID NO:91, and SEQ ID NO:93) showed specific immunoreactivity with anti-HAV IgM antibodies. In contrast, each of the three synthetic peptides that have a glutamine residue at the C-terminus (SEQ ID NO:90, SEQ ID NO:92, and SEQ ID NO:94) did show specific immunoreactivity with anti-HAV IgM antibodies. Thus, applicants show that synthetic peptides which are nine to thirty-five amino acid residues in length, which do not comprise antigenic epitopes, modified antigenic epitopes, or combinations of antigenic epitopes of the

major structural capsid polypeptides or non-structural polypeptides of HAV, and which have one glutamine residue at the C-terminus will bind an antibody directed against HAV, for example, an IgM antibody. See in the specification Example 1, pages 47-48.

Applicants have provided a sufficient description of a representative number of species of the claimed genus. The level of skill in the art is high, and one of skill would recognize that applicants were in possession of the necessary common attributes or features of the elements possessed by the members of the genus in view of the species disclosed. Therefore, applicants respectfully request withdrawal of these rejections and allowance of amended claims 44 and 46 and dependent claims 45 and 47.

Double Patenting

Claims 44-45 are rejected on the ground of non-statutory obviousness-type double patenting as allegedly being unpatentable over claims 1, 2, 7, and 9 of U.S. Patent No. 6,838,237. The Office Action goes on to state that although the conflicting claims are not identical, they are not patentably distinct from each other because the species prior art allegedly anticipates a genus of the current application.

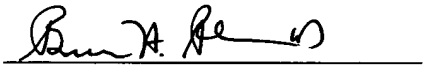
While applicants do not concede the Examiner's position, a Terminal Disclosure in compliance with 37 C.F.R. § 1.321(c) is submitted herewith. Applicants, therefore, respectfully assert that this terminal disclaimer effectively renders moot any obviousness-type double patenting rejections relating to U.S. Patent No. 6,838,237. By submitting this terminal disclaimer, it is understood that applicants do not admit obviousness-type double patenting exists in this case.

Pursuant to the above amendments and remarks, reconsideration and allowance of the pending claims are believed to be warranted, and such action is respectfully requested. The Examiner is invited to directly contact the undersigned if such contact may enhance the efficient prosecution of this application to issuance.

A Credit Card Payment Form PTO-2038 authorizing payment in the amount of $130.00 ($130.00 for a terminal disclaimer fee under 37 C.F.R. § 1.20(d)) and a Terminal Disclaimer are enclosed. This amount is believed to be correct; however, the Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 14-0629.

Respectfully submitted,

NEEDLE & ROSENBERG, P.C.



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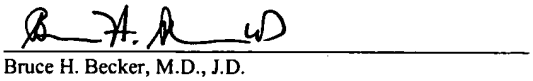

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